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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,306	07/16/2002	Young Suk Lee	5204-22	2394

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EXAMINER
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CROWELL, ANNA M

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 10/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/914,306

Applicant(s)

LEE ET AL.

Examiner

Michelle Crowell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Claims 1-8 are pending. Claims 1-8 are rejected.

#### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 7, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Hanawa et al. (U.S. 5,753,044).

Referring to Figure 12, column 3, line 56-column 4, line 38, and column 6, line 38-column 7, line 6, Hanawa et al. discloses an apparatus for forming a thin film (col. 9, lines 54-58) comprising: a chamber 10, 12 having a gas inlet 24 (col. 4, lines 47-48) and a gas outlet 26 (col. 4, lines 49-50), the chamber having an upper part with a dome configuration (Fig. 12, col. 6, line 42); a susceptor 14 provided in the chamber to place a wafer thereon (col. 4, lines 42-43); a non-mesh plasma electrode 52 to which RF power 28 is applied to generate a plasma within the chamber (col. 6, line 41, col. 7, lines 3-6); wherein the plasma electrode is of a dome shape to cover the upper part, and wherein the electrode 52 has a lower opening and an upper opening 48. The diameter of the upper opening is sized for uniform wafer processing (col. 6, lines 56-62). Furthermore, the upper opening overlies the lower opening, the upper opening has a diameter smaller than the lower opening, and the lower opening is closer to the susceptor 14 than the upper

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opening (Fig. 12). Additionally, Hanawa et al. discloses applying an RF power of less than 2000W to the plasma electrode (col.7, lines 3-6).

With respect to claims 2 and 8, the apparatus further comprises the upper opening having a width of 100 mm to 250 mm (col. 6, lines 54-62).

With respect to claim 7, Hanawa et al. discloses that the inner diameter of the electrode gradually becomes smaller from the bottom of the electrode toward the top of thereof (Fig.12).

With respect to the phrase, "to deposit a thin film having a uniform thickness", it is considered intended use. Moreover, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed (i.e. depositing a thin film) does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the **structural limitations** of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Additionally, while the features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of **structure** rather than function (In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997)). Therefore, the apparatus of Hanawa et al. satisfies the structural limitations of claims 1, 2, 7, and 8 and is capable of depositing a thin film having a uniform thickness.

*Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanawa et al. (U.S. 5,753,044) in view of Takagi et al. (U.S. 4,539,068).

The teachings of Hanawa et al. have been discussed above

Hanawa et al. fails to expressly disclose an RF power of about 700-1000W; however, a prima facie case of obviousness still exist. Referring to column 7, lines 3-6, Hanawa discloses applying an RF power of less than 2000W to the electrode. Thus, it would have been obvious to one of ordinary skill in the art to optimize the power level of

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Hanawa et al. through routine experimentation to a power level between 700-1000W in the absence of a showing of criticality in order to optimize the wafer processing conditions and uniformity. Additionally, the Federal Circuit held that where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984) cert. denied, 469 U.S. 830, 225 USPQ 232 (1984)).

Hanawa et al. fail to teach the gases  $\text{SiH}_4$  and  $\text{NH}_3$  to form a  $\text{Si}_x\text{N}_y$  thin film having a uniform thickness.

Referring to Figure 3 and column 3, line 64-column 4, line 21, Takagi et al. teaches that it is known to provide a hydrogen containing plasma gases made of  $\text{SiH}_4$  and  $\text{NH}_3$  to form a silicon nitride film ( $\text{Si}_x\text{N}_y$  thin film) having a uniform thickness. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the process chamber of Hanawa et al. with the claimed gases as taught by Takagi et al. since these are known gases used to form silicon nitride thin films.

7. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanawa et al. (U.S. 5,753,044) in view of Ong et al. (U.S. 5,645,900).

The teachings of Hanawa et al. have been discussed above

Hanawa et al. fails to expressly disclose an RF power of about 500-1000W; however, a prima facie case of obviousness still exist. Referring to column 7, lines 3-6, Hanawa discloses applying an RF power of less than 2000W to the electrode. Thus, it

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would have been obvious to one of ordinary skill in the art to optimize the power level of Hanawa et al. through routine experimentation to a power level between 500-1000W in the absence of a showing of criticality in order to optimize the wafer processing conditions and uniformity. Additionally, the Federal Circuit held that where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984) cert. denied, 469 U.S. 830, 225 USPQ 232 (1984)).

Hanawa et al. fail to teach gases CH<sub>4</sub> and H<sub>2</sub> to form a DLC thin film, and SiH<sub>4</sub>, CH<sub>4</sub>, and H<sub>2</sub> to form a SiC thin film.

Referring to column 6, line 35 – column 7, line 6, and line 30 and 47, Ong et al. teaches that it is known to provide a hydrogen containing plasma gases made of CH<sub>4</sub> and H<sub>2</sub> to form a DLC thin film and to mix SiH<sub>4</sub>, CH<sub>4</sub>, and H<sub>2</sub> to form a SiC thin film having uniform thickness. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the process chamber of Hanawa et al. with claimed gases as taught by Ong et al. since these are known gases used to form a DLC thin film and a SiC thin film.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (9:30 -6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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